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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,344	08/08/2001	Masumi Kubo	3693-22	2792

7590 06/15/2005

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EXAMINER
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RAO, SHRINIVAS H

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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**Office Action Summary**

Application No.

09/923,344

Applicant(s)

KUBO ET AL.

Examiner

Steven H. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 and 18-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-15 and 18-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 03/10/2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## ***DETAILED ACTION***

### ***Priority***

Acknowledgement is made of the papers filed under 37 CFR 1.114 requesting priority from U.S. Serial No. 09/ 923344 filed on August 08, 2001 which itself claims priority from Japanese Patent Application Nos. 2000-244648 filed on November 08, 2000., 2001-131142 filed on April 27, 2001', 2001-155928 filed on May 24, 2001 and 2001-219632 filed on July 19, 2001 which papers have been placed of record in the file.

Therefore a RCE has been established and an action on the RCE follows.

### ***Information Disclosure Statement***

Acknowledgment is made of receipt of Applicant's Information Disclosure Statement (PTO-1449) filled on March 10, 2005 are acknowledged.

All the cited references have been considered.

However the foreign patents and documents cited by applicant are considered to the extent that could be understood from the abstract and drawings.

### ***Claim Rejections - 35 USC Section 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action :

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter ms a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

A. Claims 1 to 3 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Yoshida et al. (U.S. Patent No. 6,222,599 herein after Yoshida) previously applied and further in view of Song et al. ( U.S. Patent No. 6,657,695, hereinafter Song, also cited by the Applicants' in their IDS) .

With respect to claim 1 Yoshida describes a liquid crystal display device comprising: first substrate ( Yoshida fig. 1 A # 14 , col. 5 line 50-54), second substrate ( Yoshida fig. 1 A # 12 , col. 5 line 50-54), a liquid crystal layer ( Yoshida fig. 1b) and a plurality of picture element regions each defined by a first electrode provided on a face of the first substrate facing the liquid crystal layer ( Yoshida figure 1 B # 14, 20 etc.) and a second electrode provided on the second substrate so as to oppose the first electrode ( Yoshida figure 1 B # 12 18) via the liquid crystal layer sandwiched there between, ( Yoshida figure 1 B # 16) wherein, in each of the plurality of picture element regions, and the first electrode includes a plurality of openings disposed at least corners of each of the plurality of picture element regions ( Yoshida figure 1 b, 6 etc.) and a solid portion in each of the plurality of picture element regions ( Yoshida figs. 1b ,6 etc.) the liquid crystal layer is in a vertical orientation state when no voltage is applied between the first electrode and the second electrode, ( Yoshida figure 1 B ) and when a voltage is applied between the first electrode and the second electrode, a plurality of liquid crystal domains are formed in the plurality of openings and the solid portion by inclined electric fields generated at respective edge portions of the plurality of openings of the first electrode, for producing a display by changing orientation states of the

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plurality of liquid crystal domains in accordance with applied voltage ( inherent function of every LCD, Yoshida col. 6 lines 32 to 65, etc.) .

Yoshida does not specifically mention the limitation wherein each of said liquid crystal domains includes ( a) first liquid crystal molecules oriented substantially parallel to a normal of the first substrate thereby defining an axis , and ( b) second liquid crystal molecules existing around all lateral sides of said axis and radially inclined relative to the axis.

However , Song, a patent from the same filed of endeavor describes in figures 1 b to 4 etc. and col. 5 lines 9 to 16, 34 to 41 , etc. describes each of said liquid crystal domains includes ( a) first liquid crystal molecules oriented substantially parallel to a normal of the first substrate thereby defining an axis , and ( b) second liquid crystal molecules existing around all lateral sides of said axis and radially inclined relative to the axis to provide alignment in LCD with multi domain pixel structure which can be fabricated using simple steps and the optical characteristics of the LC molecule at two side regions are compensated resulting in wide viewing angle.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Song's each of said liquid crystal domains includes ( a) first liquid crystal molecules oriented substantially parallel to a normal of the first substrate thereby defining an axis , and ( b) second liquid crystal molecules existing around all lateral sides of said axis and radially inclined relative to the axis in Yoshida's device The motivation for the above inclusion is to provide alignment in LCD with multi domain pixel

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structure which can be fabricated using simple steps and the optical characteristics of the LC molecule at two side regions are compensated resulting in wide viewing angle.

With respect to claim 2 Yoshida describes the LCD of claim1 wherein at least some of the plurality of openings have substantially the same shape and the same size and form at least one unit lattice arranged so as to have rotational symmetry ( Yoshida figures figs. 4-5 col. 7 line 58-63, col. 8 lines 1-10 fig. 6, etc. , Song figs. 7 etc.).

With respect to claim 3, Yoshida describes the liquid crystal display device of Claim 2, wherein each of the at least some of the plurality of openings is in a rotationally symmetrical shape. ( Yoshida figs. 4-5 col. 7 line 58-63, col. 8 lines 1-10).

**B.** Claims 4-15 and 18-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (U.S. Patent No. 6,222,599 herein after Yoshida) in view of Song as applied to claims 1-3 above and further in view of Uemura et al. ( U.S. Patent No. 5,636,043, herein after Uemura).

With respect to claim 4. Yoshida and Song describes the liquid crystal display device of Claim 2.

Yoshida does not specifically describe each the of at least some of the plurality of openings is in a substantially circular shape.

However, Uemura describes in at least figurel # 110 and col. 4 lines 65-67 and col. 6 lines 38 to 43 describes plurality of openings in substantially circular shape to form a device with easier elimination of orientation-related defect during application of high voltage, having no indication of surface roughness and having an improved display quality with its arrangement of

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polarizing elements optimized.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Unemera's circular shaped openings instead of the openings described by Yoshida in Yoshida's device to form a device with easier elimination of orientation-related defect during application of high voltage, having no indication of surface roughness and having an improved display quality with its arrangement of polarizing elements optimized. ( Unemera col.4 lines 23-29).

With respect to claim 5. Yoshida describes the liquid crystal display device of Claim 2, wherein each region of the solid portion surrounded with the at least some of the plurality of openings is in a substantially circular shape. ( Unemera col.4 lines 23-29).

With respect to claim 6 Yoshida describes the liquid crystal display device of Claim 2, wherein each region of the solid portion surrounded with the at least some of the plurality of openings is in a substantially rectangular shape with substantially arc-shaped corners. (Yoshida figures 28-30 and Unemera figures 6 a and b).

With respect to claim 7 Yoshida describes the liquid crystal display device of Claim 1, wherein, in each of the plurality of picture element regions, a total area of the plurality of openings of the first electrode is smaller than an area of the solid portion of the first electrode. ( Unemera figure 1).

With respect to claim 8 Yoshida describes the liquid crystal display device

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of Claim 1, further comprising a protrusion within each of the plurality of openings, wherein a cross-sectional shape of the protrusion taken along a plane direction of the substrate is the same as a shape of the corresponding opening, and a side face of the protrusion has an orientation-regulating force for orienting liquid crystal molecules of the liquid crystal layer in the same direction as an orientation-regulating direction obtained by the inclined electric field. ( Unemera figures 2 to 6 and figure 7 ).

With respect to claim 9 Yoshida describes the liquid crystal display device of Claim 1, wherein the plurality of liquid crystal domains are in a spirally radially-inclined orientation state. ( Unemera figure 8, col. 8 lines 41-60), With respect to claim 10 Yoshida describes the liquid crystal display device of Claim 9, further comprising a pair of polarizing plates respectively provided outside of the first substrate and the second substrate and disposed with polarizing axes thereof crossing each other substantially perpendicularly, ( Yoshida figure 3 A # 18, 24, col. 7 lines 27-30) wherein, in each of the plurality of liquid crystal domains, assuming that a liquid crystal molecule included in the liquid crystal layer and positioned in a 12 o'clock direction on a display-surface in regard to a center of each of said plurality of liquid crystal domains is inclined against the 12 o'clock direction on the display surface by an angle  $\theta$ , the polarization axis of one of the pair of polarizing plates is inclined in the same direction as inclination of the liquid crystal molecule positioned in the 12 o'clock direction on the display surface by an angle exceeding degree and smaller than  $2\theta$  against the 12 o'clock direction on the display surface. ( Unemera figures 8 to 11, col. 8 lines 41- 60).



With respect to claim 11 Yoshida describes the liquid crystal display device of Claim 10, wherein the polarization axis of one of the pair of polarizing plates is inclined by an angle exceeding 0 degree and equal to  $\theta$  or less. (Unemura examples 3 and 4, col. 10).

With respect to claim 12 Yoshida describes the liquid crystal display device of Claim 10, wherein the polarization axis of one of the pair of polarizing plates is inclined by an angle substantially the same as  $0^\circ/2$ . (Unemura figures 8 to 11, col. 8 lines 41-60).

With respect to claim 13 Yoshida describes the liquid crystal display device of Claim 10, wherein the polarization axis of one of the pair of polarizing plates is inclined by an angle substantially the same as  $4^\circ$ . (Unemura claim 12, figures 8 to 11, col. 8 lines 41-60).

With respect to claim 14 Yoshida describes the liquid crystal display device of Claim 1, wherein the solid portion includes a plurality of island portions arranged in the form of an  $m \times n$  matrix and a plurality of branch portions for electrically connecting adjacent pairs of the plurality of island portions, and the number of the plurality of branch portions is smaller than  $(2mn - m - n)$ . (Yoshida col. 7 lines 55-64, Unemura figure 1).

With respect to claim 15 Yoshida describes the liquid crystal display device of Claim 1, wherein the first substrate further includes an active element provided correspondingly to each of the plurality of picture element regions, and the first electrode corresponds to a picture element electrode provided in each of

the plurality of picture element regions to be switched by the active element and the second electrode corresponds to at least one counter electrode opposing the plurality of picture element electrodes. (Yoshida col. 7 lines 64 to col. 8 lines 22).

With respect to claim 18 Yoshida describes the liquid crystal display device, comprising a first substrate', second substrate; liquid crystal layer disposed between the first substrate and the second substrate', and a plurality of picture element regions each defined by a first electrode provided on a face of the first substrate facing the liquid crystal layer and a second electrode provided on the second substrate so as to oppose the first electrode via the liquid crystal layer sandwiched there between, wherein, in each of the plurality of picture element regions, the liquid crystal layer is in a vertical orientation state when no voltage is applied between the first electrode and the second electrode, and the first electrode includes a plurality of openings disposed at least corners of each of the plurality of picture element regions and a solid portion. ( rejected for reasons stated under claim 1 above) wherein a region of the solid portion surrounded with at least some of the plurality of openings is in a substantially circular shape. ( Unemera figures 6 a and b).

With respect to claim 19 Yoshida describes the liquid crystal display device comprising a first substrate', second substrate; liquid crystal layer disposed between the first substrate and the second substrate', and a plurality of picture element regions each defined by a first electrode provided on a face of the first substrate facing the liquid crystal layer and a second electrode provided on the second

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substrate so as to oppose the first electrode via the liquid crystal layer sandwiched there between, wherein, in each of the plurality of picture element regions, the liquid crystal layer is in a vertical orientation state when no voltage is applied between the first electrode and the second electrode, and the first electrode includes a plurality of openings disposed at least corners of each of the plurality of picture element regions and a solid portion. ( rejected for reasons stated under claim 1 above), wherein a region of the solid portion surrounded with at least some of the plurality of openings is in a substantially rectangular shape with substantially arc-shaped corners. (Yoshida figures 28-30, and b Unemara figures 6 a ).

With respect to claim 20 Yoshida describes the liquid crystal display device of Claim 18, wherein the solid portion includes a plurality of island portions arranged in the form of an  $m \times n$  matrix and a plurality of branch portions for electrically connecting adjacent pairs of the plurality of island portions, and the number of the plurality of branch portions is smaller than  $(2mn - m - n)$ . Yoshida col. 7 lines 55-64, Unemura figure 1).

With respect to claims 21-23 wherein LCD material has negative dielectric anisotropy ( inherent, Yoshida and Song).

With respect to claims 24- 25,27 and 28 repeat the elements of claims 1-23 are rejected for reason set out above and incorporated here by reference for the sake of brevity.

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With respect to claim 26 , Yoshida describes wherein the LCD is a combination transmission/reflection combination type liquid device . ( Yoshida fig. 13,1 5, etc.) .

With respect to claim 30 (rejected for same reason as claim 2) ,31 (rejected for same reason as claim 4) , 32 (rejected for same reason as claim 6) and 33 (rejected for same reason as claim 8).

***Response to Arguments***

Applicant's arguments with respect to claim 1-33 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is( 571) 272-1718. The examiner can normally be reached on 8.00 to 5.00.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Steven H. Rao


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Patent Examiner

May 27 , 2005.



LONG PHAM  
PRIMARY EXAMINER